

WHAT IS CLAIMED IS:

1. An optical device (D) for transforming the propagation mode of optical signals, the device comprising mode transformation means (3-5) associated with a multimode fiber (2), in which said mode transformation means (3-5) comprise first and second mode converters (3 and 5) coupled to each other by a multimode fiber portion (4) of selected length (L), said first converter (3) being fed with signals propagating in a first mode and delivering said signals to said fiber portion (4) in part in said first mode and in part in a second mode of order higher than the first, and said second converter (5) being arranged to cause the signals in said first and second modes to interfere so that, on outlet therefrom, they present a selected spectral spacing ($\Delta\lambda$).
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2. A device according to claim 1, in which the length (L) of said multimode fiber portion (4) is selected as a function of said first and second modes and of said selected spectral spacing ($\Delta\lambda$).
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3. A device according to claim 1, in which said first mode is the fundamental propagation mode.
- 25 4. A device according to claim 1, in which said first converter (3) is a 3 dB type mode converter arranged to convert about 50% of the power of the signals fed thereto and propagating in the first mode into signals propagating in the second mode.
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5. A device according to claim 1, in which said second converter (5) is a 3 dB type mode converter.
- 35 6. A device according to claim 1, implemented in the form of a multimode fiber in which said first and second mode converters (3 and 5) are implemented together with said fiber portion (4) of selected length (L).

7. A device according to claim 1, in which said first and second mode converters (3 and 5) are selected from a group comprising long period gratings, non-adiabatic
5 waveguides with progressive decrease and/or increase, and multimode couplers.
8. A device according to claim 1, characterized in that it constitutes a chromatic dispersion compensating
10 element.
9. A device (D) according to claim 1, used in a field selected from a group comprising: interlacing or multiplexing modes; filtering modes; and changing modes
15 in-line.
10. A method of transforming the propagation mode of optical signals, the method consisting in feeding a first mode converter (3) with signals propagating in a first mode so as to deliver said signals to a multimode fiber portion (4) of selected length (L) in part in said first mode and in part in a second mode of higher order, then in allowing the signals in said first and second modes to propagate in said fiber portion (4), and then in causing
20 said signals to interfere by means of a second converter (5) coupled to said fiber portion (4) in such a manner that on outlet therefrom they present a selected spectral spacing.
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- 30 11. A method according to claim 9, used in a field selected from a group comprising: interlacing or multiplexing modes; filtering modes; and changing modes in-line.